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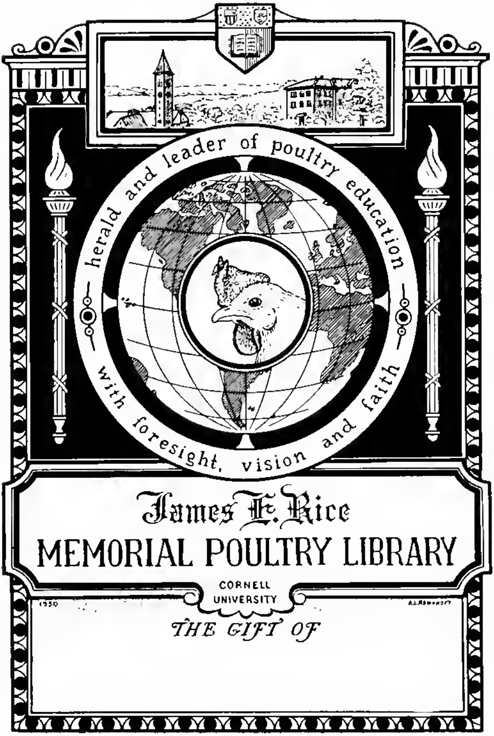

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COMMERCIAL
EGG FARMING

SOME OF THE LAYING HOUSES

Why Buy £9,000,000
Worth Per Annum
of Eggs from Foreign Countries?

COMMERCIAL EGG FARMING

FROM PRACTICAL EXPERIENCES GAINED OVER A PERIOD OF YEARS

BY

S. G. HANSON

TENTH IMPRESSION

LONDON
CONSTABLE AND COMPANY
10 & 12 ORANGE STREET, W.C. 2

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Tenth Impression . . . 1921

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FOREWORD TO THE NINTH IMPRESSION

EIGHTEEN months have almost passed since the Armistice was declared, yet the question of home production is acute and will long remain so.

Many millions of pounds sterling still go annually to pay for imported foodstuffs—why?

Are we doing our best at home and have we learned one great lesson of the war, namely, that until we materially increase our home production we are liable to starvation as a nation? Are we to see peace-time prices remaining at the high level which they have now reached largely through our apathy in the past? Are we producing scientifically and intensively as the present demands and as the future will continue increasingly to demand? The answer must be No! Yet the struggle for existence will be greater in the future than in the past.

Science alone can help us—the science of farming, the science of marketing, the science of co-operation—which gives to the small producer the advantages of the large—above all the science of science in business, whatever that business may be.

The rule of the thumb must be consigned to the limbo of the past.

When I first published this little volume, the outcome of long personal experience, intensive egg farming was in its infancy. I knew that intensive production combined with business methods in marketing could be very profitable, and I wished to make known my own results in order that my countrymen might gain from my experience. There is no room for the amateur in the world's markets.

That my book is showing the way to increased home production I know well from the daily contents of my postbag—that its advice is sound I know from the balance sheets of my own farm and from the number of similar farms which have since been established and are earning good profits in all parts of the country.

As prices have risen considerably since the book was first published and are not yet stable—nor will be in the near future—I have not considered it advisable to quote any new figures for feed, stock, eggs and materials at the present time, but I can say with confidence that the prospects for egg production are good, and that although the initial capital expenditure is much greater than in pre-war days, the returns are satisfactory.

S. G. HANSON

THE OLD DOWN, BASINGSTOKE
May, 1920

COMMERCIAL EGG FARMING

THE United Kingdom in ordinary years imports nine millions sterling (£9,000,000) worth of eggs. There is no reason why this large sum of money, or even any considerable portion of it, should go to foreign countries.

There is nothing in the climate of a large part of the United Kingdom, nor in the labour conditions, nor in the price of land, nor in the soil conditions to prevent egg production being carried on as a profitable commercial undertaking.

It has generally been assumed that eggs cannot be marketed at a profit unless their production is carried on as a subsidiary branch of ordinary farming. This assumption rests solely on the fact that a large number of persons, unfitted by experience and business capability, and with insufficient capital at their disposal, have, after a few years' trial of poultry farming, found themselves obliged to discontinue their operations. If an inquiry could be made into the previous business success of any one hundred persons who have given up poultry farming, I believe it would be found that ninety-nine of them had failed in every undertaking in which they had previously embarked, and that every one of them had gone into poultry farming as a "last resort." If a man were to go into any kind of business as unequipped for its successful prosecution as the average man embarks upon poultry farming, his end would be equally dismal, but one does not hear it said on all sides, that, for instance, pawnbroking, grocery, the drapery business does not pay, as one does of poultry farming, but simply that So-and-so did not know his business or had not sufficient capital.

It is my opinion, based upon my own practical experience, that poultry farming, purely for egg production, can, if carried out on business lines, be made to pay very good interest on the capital invested, and my experience has been obtained and a very good income gained from egg production during the last ten years, both in Vancouver Island, B.C., and in England. I am not a poultry farmer because I like hens or because I like the business, but simply because

I do not know how to earn an equal income so easily in any other way. It has always been with me a strictly commercial undertaking, and if any other branch of farming had shown me better opportunities I should probably have gone into that. It may be of interest to those who think of taking up egg production to learn the reasons why I adopted this branch of poultry farming. Until 1904 I was engaged in general farming in Vancouver Island, B.C. The income derived from that industry was earned with difficulty and the prospects were not encouraging. I experimented with various crops and kept careful accounts ; the work was out of all proportion to the earnings. In 1904 I met a man who said he knew something of poultry farming. We made an agreement, he to find the experience, I to find land and capital. At the end of a year, when he left, my accounts showed a very good return on the capital, though these early beginnings were on the old-established formula : ten birds in a flock, hot wet mashes, and so on. By 1906 I had seen that unless some scheme for great reduction in labour, better housing, hatching on a larger scale, etc., could be devised, and a safe income assured from egg production only, a scheme by which all charges would have to be borne by the birds, my position would not be a much better one than that from which I was endeavouring to escape.

It would not serve any useful purpose to trace step by step the various expedients to which I was put, the different houses I designed, etc.; but in 1907 I had an opportunity of selling my farm and risking the money in starting an egg farm. The customary opinion was freely expressed by my neighbours, namely, that no one could make poultry farming pay and so forth, and the term of my effort was put down at two to three years.

What had finally induced me to embark on the egg farm was that I had cleared $1100, above cost of feed, on 425 hens in 1906. I argued that if I could do that with 425 birds, there was a good margin to work on, and that 1000 birds should show as good or nearly as good a return in comparison.

That first egg farm was a success; I did not work as hard as my neighbours, all farmers, and I made more money.

The labour conditions in British Columbia had become acute, and there seemed to be no prospect of obtaining labour at rational wages.

We were paying 10s. a day for a Japanese labourer. I believed that market prices for eggs in England were such as to show a reasonable profit on their production, that labour could be had, etc., so I sold the farm and came home.

The same dismal croaking met me here when I mentioned that I was going to start an egg farm. But I had already lived through the same experience elsewhere, and indeed when I started poultry farming in British Columbia a man could not obtain cash for his eggs, but had to "take it out in trade," in other words, the storekeeper fixed the price both of his own goods and those one sold him; whereas when I left the small settlement in which I had been living, and where many men had copied my methods, over £20,000 worth of eggs were produced per annum by men who formerly had been unable to get cash, but now had, through co-operation, a ready market with customers on the mainland.

With this experience behind me, and my knowledge of the climate, soil, markets, etc., of England, I had no fear as to the results of my methods when applied to English markets.

Not for one moment do I wish it to be inferred that my methods are alone of all methods successful. I am not a poultry expert, and do not pretend to expert knowledge of any other branch of poultry farming than that of egg production. But the methods stated here have during the past years given me a very good return on the money invested, and I know from others who have adopted this system that in every case the results have been equally good. The principles of this system are :—

1. I breed from constitutionally vigorous hens, pure-bred White Leghorns for choice, that have completed their second year and shown a productivity of at least 144 eggs per bird.
2. I mate these hens to cockerels, one year old birds, bred from trap-nested stock, whose mothers have in their pullet year laid not less than 200 eggs per bird. The cockerels which are used must be of good type and vigorous.
3. The chicks from these matings are brought up entirely on dry food ; no wet mash of any kind at any period of their lives is fed to them ; they are not coddled ; any chick which looks weak is killed.

4. No attempt is made to doctor or cure birds; any bird not looking well is killed.
5. The pullets are run in flocks of 400 birds, no cockerels being run with them.
6. Infertile eggs alone are sold for eating.
7. The breeding pens consist of 400 two-year-old hens, mated to 20 cockerels, run as one flock.
8. Each house, 180 feet long, holding 400 birds, stands on one acre. The southern half-acre is used in winter, the northern half-acre in summer. Each yard, as it is vacated, is ploughed and harrowed, and sown with thousand-headed kale.
9. Regularity in cleaning houses and disinfecting them is essential.
10. Dry mash, in boxes attached to partitions in the laying houses, is accessible to the birds at all times.

BREEDING

It is a widely accepted theory that constitution is inherited from the female in any animal. Birds, to produce 144 eggs or more in their pullet year, must have strong constitutions and stamina. It is impossible by breeding from a pullet or immature female to be certain that the progeny will have sufficiently strong constitutions, because you have no data to go on. The pullet mother may develop unsuspected weakness at the end of the laying season, and may not go through the moult well or may die during the moult. The chicks bred from her in the spring probably have inherited her latent weakness. But if you breed from two-year-old hens you have at least ascertained one valuable fact, because the two-year-old bird has gone through her first laying creditably and has not shown weakness in the moult. If weakness has been shown, she naturally is not used as a breeder. Very many poultry farms owe their failure to the temptation to breed from pullets. It is not easy to get eggs early in the year from two-year-old birds, but pullets are laying well. So pullet eggs are used, and disaster in two or three years nearly always overtakes the man who has been so tempted, for his stock becomes weaker each year, and unable to produce strong healthy chicks which will live and stand the strain of laying sufficient eggs to pay their owner.

Too much stress, in my opinion, cannot be put on this cardinal factor: that constitutional vigour is the first necessity of a successful egg farm.

A farmer who knows his job does not breed from a young heifer, neither does a horse man breed from a filly. The reason is the same in both cases; they know that they could not count on getting strong calves or foals.

Having selected vigorous two-year-old hens for the breeding stock, it is necessary to mate these birds with young cockerels bred from hens with trap-nested records of not less than 200 eggs in their pullet year. By experiments it has been proved that the cockerel is not merely "half the flock," but very nearly the whole thing. The high-producing hen does not transmit her ability to lay great quantities of eggs to the female progeny, but the male bird inherits this quality, which he transmits to his progeny. So that in face of that experience it is absolutely necessary to be certain of the breeding of the cockerels which you are going to employ. It is to be supposed that a fairly high price must be paid for birds of this type. You pay for the breeder's knowledge, the breeder's business character, the breeder's trouble, and the expenses incurred in producing birds or eggs of this quality. But if it is kept in mind that the cockerel is "nearly all the flock," then a fair price is only reasonable. Cockerels are used because of their vigour; a two-year-old cock is not likely to throw such strong chicks, or to be able to attend to so many hens.

The birds must be mated at least ten days before the eggs are collected for incubating purposes. If 20 or 25 hens are in one pen, one Leghorn cockerel is sufficient; if 50 birds, it is necessary to run three cockerels with them, because if only two cockerels were used, one would drive the other away. But one will not drive off the other two, even if he is boss of the pen. With flocks of 100, 200, or 400 hens the proportion of cockerels is 5, 10, 20, or one cockerel to 20 hens.

Immediately the breeding season is over the cocks (as they will be by then) are sold either to people who want to use two-year-old cocks, or sent to Smithfield. They are never used a second season on this farm, however good they may be.

INCUBATING

The time to start hatching White Leghorns, bred purely for egg production, is about April 10th. If birds of this breed are hatched earlier than April they will lay too soon, perhaps in July or August; their eggs will only be small; they will not lay many eggs, and in October or

November they will moult and not commence to lay again perhaps until January or even February. The period of high prices for eggs will thus be missed.

When I have been short of eggs for my incubators early in the year, I have kept them as long as 21 days in a moderately cool room, at a temperature of not less than 40° or more than 60°, turned them slightly every day, and had fairly good hatches. But the best hatches are obtained from eggs which are not more than 7 days old. The eggs to be hatched should be of not less than 2 oz. in weight, and not more than 2½ oz. Very small and very big eggs are not desirable. They should be of good shape, not long and thin or otherwise unusual, and have no malformity, such as "Rings," etc. Also they must be clean.

Eggs coming from a distance by rail will not as a rule hatch as well as those produced on the farm and placed in the incubator without jarring. But as it is necessary for me to buy eggs for the purpose of obtaining cockerels to mate with the following year's breeding hens, the loss entailed by broken eggs and broken yolks must be borne with. I have made it a practice, during all the years in which I have been poultry farming, to introduce new blood from the very best flocks in existence, and the wisdom of this practice is proved year by year by the continuously increased egg average of the flock and the stamina and health of the birds.

There are many who believe that the introduction of new blood into a flock from even the best outside sources will only do damage as far as egg production is concerned, and consequently these breeders practise "line breeding." Line breeding is only possible for the very expert breeder, as, if mistakes are made, all the mischief of inbreeding must soon be apparent in the flock, i.e., low fertility of the eggs, difficulty in rearing the chicks, and loss of stamina in the birds. My experience has proved to me that it is not necessary to "line breed" in order to keep up or increase the egg average, and no risk is run with the health of the birds.

All incubator manufacturers furnish rules with their machines, so that nothing need be said on the actual running of an incubator. It is necessary with all machines that the room in which they are placed should be well ventilated, about the same atmosphere should prevail as for a living room. I now use a "Mammoth

Incubator" with a capacity of 2500 eggs, but the management is just the same as for a small one. Formerly I used to use six incubators, each of 400 egg capacity, and in consequence six lamps had to be attended to. Now I have one fire which burns anthracite. The machine is not cheap, but it saves an hour a day in attention, and the cost of running it for the same number of eggs is less than when I used oil.

BROODER HOUSE MANAGEMENT

The perfect brooding arrangement has not yet been invented; all systems have one or more defects. The cold brooder is not suited to the English climate; oil-lamp brooders are difficult to ventilate properly, and the fumes from the oil are dangerous. Brooder houses heated with hot-water pipes are the most economical to run, but the percentage of deaths among the chicks is considerable. The large American brooder houses, 24 feet by 12 feet, for flocks of 600 chicks, heated by a central stove, when in charge of an experienced person are said to give good results, but I have no experience of their management.

I started with oil-lamp brooders, but the lamps and the ventilation of the sleeping quarters required so much attention that I saw that if large numbers of chicks were wanted some other system would have to be adopted. People who are only raising 200 or 300 chicks can manage with oil lamps, but when one goes into poultry farming commercially, chicks must be raised by the thousand at the least cost of time and labour. The brooder house which I use is 110 feet long by 12 feet wide. There is a 4-foot passage running along the back of the building. The front is divided into twenty compartments, each 5 feet wide, each with a capacity of 125 chicks. Ten compartments are on either side of the stove, which is in the centre of the building and occupies with coal space 10 feet. The stove is an ordinary water-jacket arrangement with fairly large coal capacity. Two 2-inch pipes run from the stove to both sides to the extremities of the building, and two 2-inch pipes return to it. Ordinary anthracite coal is used as fuel. If the fire is properly made, it will last for twelve hours without attention, and will keep the water in the pipes hot enough for quite young chicks. The pipes start from the stove at about 5 inches above the floor level and gradually rise in level by 5 inches in each 50 feet, which is sufficient for the circulation. On the floor of the compartments is put coarse sand, and over that chaff. As the pipes rise, more sand is put on the floor underneath them to make up the level within 3 inches of the pipes. A board is placed over the pipes to keep the heat down on the chicks, and for the first week a sack is thrown over the board for extra protection.

About a week before the chicks are due from the incubator, the fire in the brooder house is started and kept going in order thoroughly to dry the sand, which is spread in the pens some months before. When the chicks are ready to leave the incubator, they are placed in ordinary chick boxes and taken to the brooder house, where they are put under the pipes. There they remain for 36 to 48 hours without any food, but they can run about near the pipes, the side nearest the windows being blocked with a piece of board for two days, by which time the chicks are accustomed to their home. The board can now be removed, and they have the run of the whole pen. When first allowed the full run of the pen, some attention must be given to see that all the chicks can find their way back to the warmth, and if it is noticed that any are standing about or lift their voices, these must be put under the pipes, and the operation continued, until it is certain that all know their way back.

The first feed is given when the chicks cry out, and consists of "kibbled" wheat or any ordinary commercial chick food. But if the latter, see that you give a kind which does not contain "grit" nor too much maize. The coarse sand on the floor is quite sufficient for the chicks in the way of grit. Water, in which a very little permanganate of potash is put, is given at the same time as the first feed of grain, and thereafter during the chicks' life in the brooder house it is given twice a day, the drinking vessels on each occasion being thoroughly cleaned and rinsed with disinfectant. This is most important. It is nearly impossible to keep water for chicks clean, and the cause of many chick troubles can be traced to an insufficient supply of perfectly clean water given in clean vessels. When the chicks have the full use of their brooder house pen, sufficient grain is scattered in the chaff to last for two days, and a little ground charcoal is given in a tray. That is the whole attention required for the first week. The charcoal keeps the bowels in order and seems to prevent many chick disorders.

The second week the sacks are taken from the boards over the pipes, and a dish containing broad bran mixed with charcoal is left in every pen, enough grain is fed to last two days, water given as usual, and if the weather is reasonably fine the chicks are allowed out in the outside run which is attached to each inside run. There they find green food in the shape of kale or turnips or lettuce. During the first day or two of their new experience, fairly constant attention must be given to them in order that none that are outside cannot find the way home. They easily get cold, and bowel trouble ensues.

The third week dry mash is given in place of the bran, everything else being the same as for the second week.

In the fourth week the chicks are given a rather larger sample of grain, for it is cheaper. The board is removed from the top of the pipes, and a small door is opened at the end of the outside run, which admits them into a half-acre field, where the chicks of one age mix and find their way back to any pen that suits them, some pens having then twice the number of chicks as others. The extra exercise, it is considered, more than balances the harm which might be caused by the extra number of chicks in some of the pens.

That is all the attention that my chicks get, and they do well on it until they are moved out of the brooder house into the colony houses. If any chick does not look well or does not grow as fast as the others it is killed. A good many cockerels can be distinguished at six weeks of age. Some are sent to London and fetch from 9d. to 1s. each. Others are kept another month or so and sold for about 1s. 6d. There is no money in fattening Leghorn cockerels, and it is better to get rid of them at any price rather than have to give time, labour, and house accommodation, which would be better spent on the pullets. There is, however, a house with alternate yards for cockerels only, on this farm, where the cockerels, which are wanted for the following year's breeding season, are kept over the autumn and winter, running together in one flock. No attempt is made to keep them from fighting, and the best birds amongst the survivors are then used in the breeding pens. A separate compartment and yard of this house is used for cockerels which supply our table with poultry.

No medicine or doctoring is given to the chicks. Those that don't grow well have to perish. A chick is not of great value, but it might be the cause of a big loss to the flock if its disease should spread to others.

The outside runs are dug up immediately they are vacant, limed and planted with any quick-growing plant. If possible, two crops are taken from these yards before the next spring, so as to ensure that the land is not fouled. But as these yards are only in use eight weeks in the year, and are dug and limed and planted, I do not see that there is any danger of this happening. If evidence of the land becoming "chicken sick" or becoming full of gape worms, accumulated, I should disinfect the yards before digging with a strong disinfectant, and if that failed, then the removal of the soil to a depth of six inches, replacing it by absolutely clean soil, would not be a big undertaking and would certainly be effective.

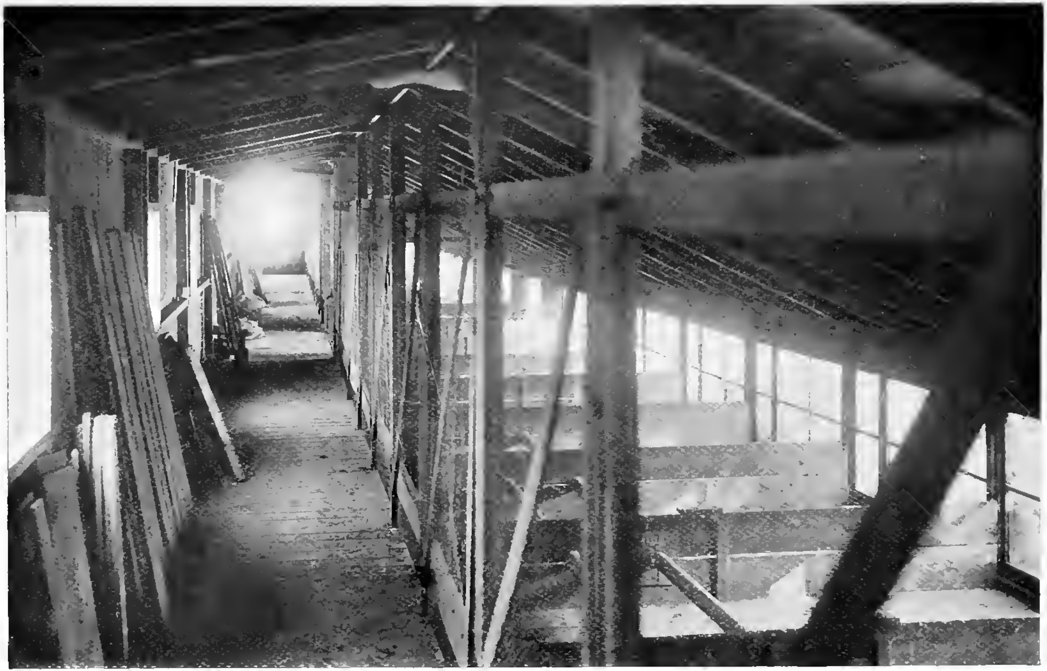
When the brooder house is emptied the pens are cleaned and disinfected. All the boards are creosoted and fresh sand is put in the pens to be in readiness for the following spring.

The cost of coal works out at about one farthing per chick per month.

Colony Houses

When the chicks are about six weeks of age they are, if the weather is reasonably fine, taken out of the brooder house. Should the weather be cold and wet, they are kept in the brooder house another week or more. The arrangements for ventilation and heating in the brooder house are such that the chicks always get plenty of fresh air, and can always get away from the pipes if they feel too warm, the danger of too much heat, which would weaken the birds, being thus reduced to a minimum.

Any ordinary colony houses, which are only in use until the laying houses are ready to receive the pullets, will do for the chickens, provided that there is plenty of air and that the floor is dry. I use a sort of miniature laying house, 5 feet by 4 feet, glass in front; the air comes in under the hood as in my laying houses. Three perches can be put in, and a detachable arrangement, which looks like a nest box from the outside, but which is divided into three compartments to hold dry mash, grain, and water, with a lid on hinges, is in front of the house. The floor is covered to the depth of two inches with peat-moss litter. A small yard is erected



INTERIOR OF 110 FT. LONG BROODER HOUSE

SHOWING PENS, GANGWAY AT BACK AND WATER PIPES

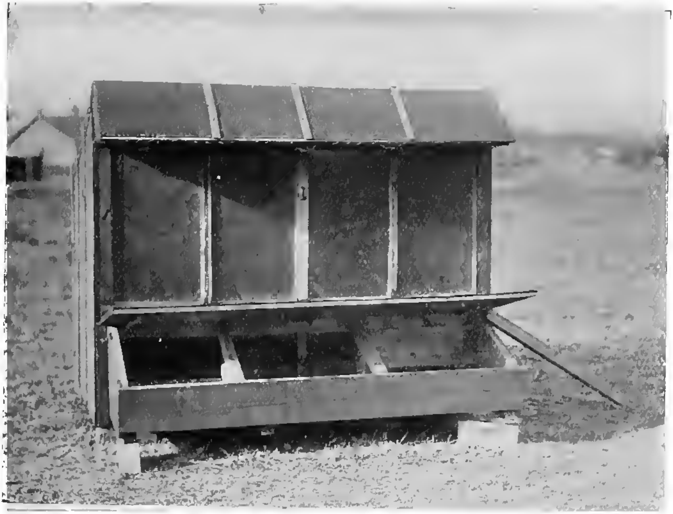
To face page 28

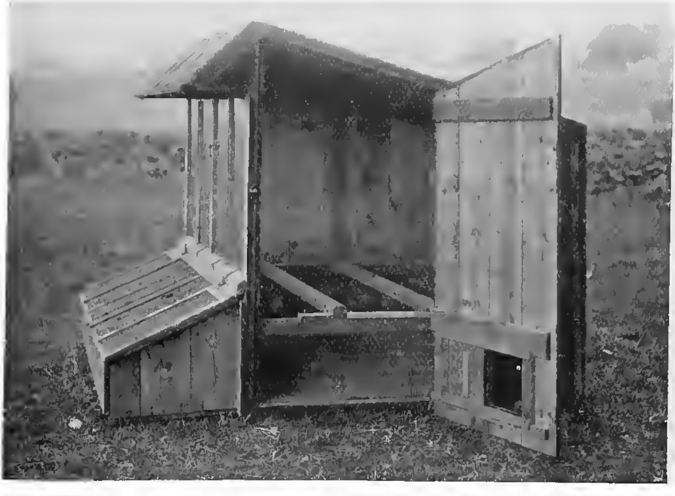
round each house for use of the birds until they are accustomed to their new home. Generally if they have been confined in the yard for two days, the wire-netting can be rolled up, and the birds can then have free range and will find their way home.

They are watered twice a day, grain and dry mash and coarse sand mixed with grit being always kept before them. If the summer should be dry, extra green stuff is given; in this case the grass of the field on which they are running would be insufficient, as it would naturally be too dried up. The houses are cleaned once or twice a week as required, and once a month they are disinfected by means of a spray pump and a strong disinfectant.

When the birds are first put in the houses, ordinarily 50 in each house, they have a tendency to crowd together for the first few nights. To prevent this I make up the corners of the houses so that they are raised above the ordinary floor level. I am told that if a stable lantern is hung from the roof, so that the bottom is two or three inches from the floor, the birds will collect round the light and not crowd. I have not yet tried it. Besides losing birds by being crushed to death, the crowding in corners causes the birds to sweat, and thereby weakens them. I differ from many others in the matter of allowing birds to perch early. I am always pleased when they take to the perch, because crowding troubles are then at an end, and I have not found that my flock has crooked breast-bones in excess of the number in other flocks which are not allowed to perch as early as mine.

The birds stay in these houses until about five months of age and then are removed to the laying houses, which have been gradually emptied of those birds whose life of usefulness, as far as I am concerned, has come to an end. I endeavour to restock half my houses every year with pullets, the other half of the houses containing hens from which I breed the next year's pullets. I believe that it would be better to restock three-quarters of the houses every year, as far as the income from commercial egg production alone is concerned, and use only the other quarter for breeding stock. But I have been fortunate enough to secure a market for eggs for hatching, which takes during two months of the year all the eggs from all my hens which are not required for my own hatching purposes.





COLONY HOUSES FOR GROWING PULLETS

OPEN AND CLOSED FEEDING AND WATER BOX

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There are many who argue that the cost of raising so many pullets yearly is too great, and therefore they keep the hens another season and raise only one-third of the total stock each year. In my opinion this is not sound business. If I were short of stock—supposing my hatching and brooding season had not gone as I counted on its going—then I should without hesitation keep on hens for another season which in ordinary good breeding seasons I should sell off in August and September. But I know from many years' accounts that my net income would not be as good as if I had my usual supply of pullets. For one thing, it is very unusual to get eggs from even one-year-old hens before January, after the moult, and then not in paying quantities, but pullets will be laying in November, fairly well in December, and very well in January. All these months are months for high prices for eggs; one dozen eggs during that period is equal to two or more dozens in the spring.

Taking one year with another, the cost of raising pullets to the laying age, including the value of the eggs for hatching and the cost of fuel, labour, feed, etc., is about set off by the price which I get for the hens wholesale in the

London market at the end of their second season; therefore, as far as I am concerned, it would be foolish not to raise yearly all the pullets which I require to restock half the houses. I believe that experiments have proved that one dozen pullets as profit-earners are equal to two dozen yearling hens, and to three dozen two-year-old hens. That, I think, is pretty nearly my own experience.

Laying Houses and Management

The houses which I use are 180 feet long by 9 feet wide; 7 feet high in front, 4 feet at back. They will comfortably house 400 birds. Each house is situated in the centre of an acre of land. One half-acre is on the south side and is used by the birds in winter, the other half-acre is at the back of the house and is used in summer. Small doors, both in the south and north sides, give access to the respective yards. By these means one-half the land gets a rest from the birds for six months out of every twelve, and during the period of rest is ploughed, harrowed, and a green crop is sown. By the end of the six months there is plenty of green stuff for the birds to eat, and the growing of the crop has sweetened the soil. It is necessary either to move the houses every year or to arrange as I have done, and give the birds practically fresh land. In the first case, if the moving of houses is adopted, only small houses can be used, and it is the small house system which I lay myself out to avoid. It does not matter how small a flock is, or how big the area of land on which the birds run: in time the land around the house will become fouled. Therefore it is simpler to arrange alternate yards, which in turn are cultivated and grow crops. Merely digging or ploughing is not sufficient in itself; crops must be grown to remove the manure, and the birds must be kept off that part which is under crop, for the full period of six months.

The advantages of running fairly large flocks of birds in a big house are these: fewer doors to open and shut, less wire-netting, fewer drinking vessels to clean and fill; and instead of digging the yards by hand they can be ploughed. At first sight these advantages do not appear great, but suppose that instead of my four houses, holding 1600 birds, I had 160 houses, each holding ten birds. That would mean 160 doors to open and shut, at least three times a day, as against opening and shutting eight doors for my four houses. The difference in time in one day must be considerable. 160 × 3 equals 480 doors to open and shut in a day; in a week it is 3360 doors to open and shut. Against this you have 8 × 3 equals 24 doors to open and shut in a day, and in a week it amounts to 168. Roughly speaking, what is done in a week's work on my farm in regard to this item alone has to be done by the small house system every day.

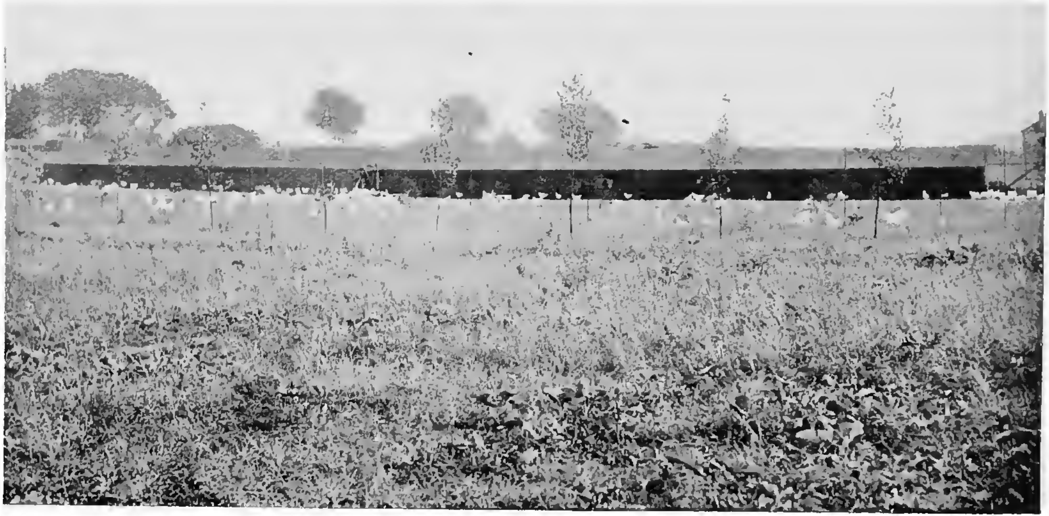
The same applies to the number of gates going into the yards.

Then there is a great saving of money in the netting for the yards. These 160 houses would want 2 yards (poultry runs) each, which is equal to 320 yards (poultry runs), and these would require about 5280 yards of wire-netting with posts every ten feet. My 8 yards (poultry runs) sufficient for the same number of birds as the above 320 yards require only 2200 yards of wire-netting with the proportionate number of posts. Ploughing, which can of course only be done in big yards, is infinitely cheaper than digging, which must be resorted to in small yards. Each of the small houses must have a water dish, in all 160 dishes; I have 8 dishes for each house, 32 dishes in all. I judge that I save on these items not far short of four hours a day of one man's time.

The other advantages of the big house system are that the attendant is under cover in bad weather, when feeding the birds, collecting eggs, and cleaning houses, and the chief advantage, as far as the birds are concerned, is that they have a large, dry, well-ventilated place in which they are fed and can scratch, and are thus independent of the weather, however bad it is.

It is sometimes claimed that small flocks give a better egg yield per bird than large flocks. This is not my experience. For three years I had various types of small houses, holding from ten birds to fifty birds, and never had as good results as I now have in my big houses. Possibly I may know more about management and feeding and breeding than I did in the early days, but nothing that I have seen or read has shown me that the extra labour and expense involved in the small house system is compensated by an egg yield sufficient to warrant changing my present methods. It is also claimed that there is less danger in the small flock system should disease break out. I can believe that this may be so, but I maintain that if my methods are carried out properly disease will not appear in the large flock system, and my opinion has the backing of very many years' experience of this system. Had I seen success in poultry farming as usually practised I should not have tried other methods, but my early experience, and all I could read about poultry, did not lead me to think that the small house system could be a commercial success. To make profits was the sole object of my poultry farming, and the big house system has been the natural outcome of my experiments.

My houses are divided into compartments, each 10 feet wide, by partitions running 6 feet across the house. The object of these partitions is to prevent draughts striking the birds when they are on the perches. These perches are at the back of the house, raised nine inches above the dropping boards, which latter are 2 feet above the floor. The front of the house is boarded 2 feet 6 inches up from the floor, and above the boards is glass. In Canada, although much colder than in England, I used wire-netting only, but in my present locality the winds are so strong that when there is rain the rain is blown right across the floor. Therefore I put in ordinary horticultural glass, held in place by strips of wood, to the level of the bottom of the hood. The hood projects about 20 inches and admits all the air that is



NORTH SIDE AND YARDS OF A 180 FT. LAYING HOUSE

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necessary; a proof of this is that at no time of the year is there any objectionable smell in the house. The roof and back and sides of the house are covered with a good roofing felt. If a house has a large open ventilating space, as my houses have, then it is necessary to make the back of the house as nearly airtight as possible. Boards, however good and closely fitted, are bound to admit air or allow air to pass through. Proper ventilation without draughts is necessary if colds and troubles of that kind are to be avoided. In front of the house, and below the level of the glass, nest boxes are placed. They are so arranged that they can be taken off and easily disinfected. Above and close to the nest boxes, but directly under the hood, are a few broody coops, the hood and the front of the house forming two sides, the bottom consisting of strong wire-netting. There are always a few broodies, even amongst Leghorns, but these airy broody coops soon cure them of the inclination to sit. The floor of the house is of wood, and is covered with 2 or 3 inches of peat-moss litter or dry sand, and on that is kept 6 inches of straw. When the straw gets reduced to chaff or dust by the energy of the birds in their scratching for grain more straw is put in. But only once a year is the litter completely cleared out, and then the floor is tarred or creosoted, fresh peat moss, etc., is put in, and it goes for another year. The houses are so perfectly dry that it is not necessary more often to clean out completely. The dropping boards are cleaned twice a week, and in spring, summer, and autumn are disinfected once a month by means of a spray pump throwing a strong commercial disinfectant through very fine spray. At the same time all the back of the house, both above and below the dropping boards, and the sides of the partitions, are treated in the same way. The perches are taken out of their sockets and creosoted every month, except in winter, when paraffin is used because it dries quicker.

My houses, being 180 feet long by 9 feet wide, have a floor space of 1620 square feet, which gives 4 square feet per bird when 400 birds are in one house. The grain is fed in the morning in the litter on the floor, at the rate of about 12 lbs. per 100 birds, and whatever the state of the weather the scratching in these 6 inches of dry litter promotes exercise and keeps the birds healthy, and in consequence induces them to lay. Nothing can be expected from a hen when she is fed her grain on sodden earth outside a dark roosting house, in rain or wind. In the worst weather the hens on this farm can be seen scratching all day long in these dry, well-lighted, and well-ventilated houses, whereas on similar days the birds housed in small houses would be crouched miserably in a corner or sitting on a perch. These houses before the war cost about £100 each, that is 5s. per bird. They last for very many years, the only upkeep being the annual creosoting of the inside and front outside, and every other year a coat of tar for the roof and the back outside.

Every partition has a dry mash box screwed on to the wall, the bottom of the box being about 9 inches above the level of the litter on the floor. The boxes are 24 inches long, 8 inches wide, 6 inches deep; laths are nailed at intervals of 3 inches across the top to prevent the birds from getting into the boxes and scratching the mash out. The boxes are never filled more than three-quarters full, as the birds would hook the mash out with their beaks.

The advantages of feeding dry mash are: greater health of the birds and saving of labour.

To mix wet mash and feed 400 birds takes at least one hour a day, and unless the mash is carefully mixed to the right consistency it is apt to give bowel trouble. In addition, it is not always possible to judge the amount which the birds will eat on any particular day, and consequently on some days they may get too little, and it is necessary to mix more; or too much may be given, and then it is wasted, and must be gathered up, because once wet it will not keep. Dry mash, in boxes always accessible to the birds, is given only twice a week on this farm. If I had more boxes, once a week would do. As it is dry and in a dry place, it never spoils and is never heated. You can be sure that every bird gets as much as she wants, because there is always mash in the boxes. There is no crowding, as in feeding wet mash, with the result that the weaker birds do not get their proper share. There is no gorging, because it is impossible for a hen to take more than a few mouthfuls at a time on account of its dryness. She has to go out to the drinking vessel and mix her mash for herself with water; then comes back for a little more mash, and then goes for a little more water. Thus, what with scratching for grain, mixing her own mash, and going out in the yard for green stuff she is kept busy, and a busy hen is always healthy, and

TWO LAYING HOUSES, EACH 180 FT. LONG

NORTH YARDS

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therefore in condition to lay. The wet mash fed bird will often swallow a lot of mash in a few minutes and then loaf about in a corner; she puts on fat and therefore will not lay. Again, the dry mash feeding is much the best for anyone starting poultry farming, as the knowledge required in mixing wet mashes and feeding them is considerable. The dry mash is left for the birds to help themselves, and the mixing rests with them.

The composition of dry mash varies with the price of the feeds, and slightly with the season. The feeding value that I try to obtain for the dry mash is always about one part protein to three parts carbohydrates; and with the grain fed in the morning the combined ration works out at one part protein to four parts carbohydrates.

I usually use ground oats and Soya-bean meal in my mash, but at the present time both these feeds are too dear for my purposes. In consequence I am using a mash composed of 50 lbs. of bran, 50 lbs. of middlings, 50 lbs. of maize meal, 50 lbs. of fish meal, and 1 lb. of salt, with cracked maize fed as grain in the morning, and I am getting very good results in the matter of eggs.

Cracked maize is the cheapest grain at present (January, 1916). It has a name for giving liver complaints to birds, being too fattening, etc. I have, for my part, never found any harm in feeding maize in any season, and in my early days I fed whole maize only, no other kind of food whatever being given to the birds, in whatever temperature, from 3° below zero to 100° in the shade, and that flock averaged 178 eggs per bird. I do not know if cracked maize would do with the heavy breeds, but I know it gives good results when fed to White Leghorns.

As I said before, the birds are bred from when two years old, and are mated with cockerels bred from hens with high egg yields. About 20 cockerels are placed with 400 hens, and the fertility has always been high.

The best of the hens are sold at the end of the breeding season for breeding purposes, the others are sent alive to Smithfield markets.

That is the whole system. It is simple, and I hope I have made it clear.

WHY WHITE LEGHORNS WERE CHOSEN

All the commercial egg farms throughout the world, running from 1000 to 10,000 layers, representing in many cases a large capital investment, use White Leghorns. I have heard of very few examples of a really large commercial farm running any other breed. The reasons for this are the following: The White Leghorns lay a fairly large egg; they are hardier than any other breed; the eggs are more fertile than those of other breeds; the chicks are easier to rear; they develop quickly; they eat less food per dozen eggs laid than any other breed, consequently they are commercially the best birds for egg production; they are non-sitters, and roughly not more than 5 per cent go broody.

The English White Leghorn has developed into an ungainly monstrosity weighing 6 lbs. or more. It has been bred for size at the expense of the egg-laying qualities. The American, Australian and Danish White Leghorns, weighing about 3 to 3½ lbs., are the birds to use. Egg-laying competitions have proved this weight to be the best for egg production. My original stock here are Danish birds which I imported direct.

TRAPNESTING

The cost of trapnesting is prohibitive for commercial purposes. It is of course the only way of knowing for certain which birds are good, which bad layers, but the value of the knowledge ascertained is not in proportion to the expense incurred. According to the accounts of the Maine Experimental Farm, U.S.A., the trapnesting of a flock of 500 birds required one man's time of 10 hours a day. This, at 25s. a week, represents £65 a year, and adds 2s. 6d. to the cost of labour for each bird.

Professor Rice of Cornell University, New York, proved by experiments that the birds ascertained by means of trapnesting to be the best layers, were invariably the latest moulting birds. Without ever having used trapnests I also had come to the conclusion that the latest moulting birds are the best layers, some years before Prof. Rice had published the result of his experiments, and I have every reason to believe that this is correct, as during more than ten years my flock average has steadily increased, though I never used any other method to ascertain the best breeders. It does not give the accurate data of trapnesting, but it gives the general information in groups. If therefore the birds which moult in July and August are sent to market, you know fairly accurately that you have got rid of the worst birds, and you will breed from those only which moult in September. October and November.

Commercial egg farming cannot concern itself with individual records, because the breeding pens are large and the whole business rests on selling eggs whose production costs as little as possible. Far too much is written in the poultry press about the high records of a single hen or of small flocks of 6, 10 or 20 birds, and practically nothing is said about averages of flocks of 500 birds and over, which are the only ones that count commercially. It is a far greater achievement to have a flock of 500 birds with an average of 144 eggs each bird, than to have a flock of 20 hens averaging 250 eggs each. The former is a business proposition, the latter is a hobby which will never serve to increase the egg production in England.

If the later moulting birds are mated to cockerels bred from known high producing hens, a good flock average can be depended on. In 1914–15 I sent four pullets, picked at random, to the Utility Poultry Club's Competition at Sedlescombe. These birds averaged 212 eggs each. I do not pretend that my whole flock average 200 eggs, and there is no one in the whole world who can claim to have a flock of 500 birds or over averaging 200 eggs. By the means indicated I have had flocks of various sizes averaging 144 eggs per bird to 178 eggs per bird.

I repeat that in this business it is the flock average which counts, and not the individual record hen.

DRINKING WATER

Permanganate of Potash is added to the drinking water of all the chicks and birds in sufficient strength to colour the water deep red. It is supposed to act as a mild disinfectant and to have a good effect on the general health of the birds. It is given to the chicks and growing stock every day, to the hens five days a week. The remaining two days the hens get a very weak solution of Sulphate of Iron instead.

WATER SYSTEM

On a large farm a water system must be introduced. The initial outlay is very soon paid for by the lessened labour. Hens require a lot of water, and unless it is quite easily obtained they frequently get too little, or the water is not changed often enough, either of which deficencies will certainly decrease the profit.

You have either to lay out some capital

INTERIOR OF LAYING HOUSE

SHOWING PARTITIONS, GLASS FRONT AND DRY MASH BOXES

and have a small bill for labour for watering the birds, or you must have a large labour bill for watering. This latter would in course of time exceed the sum which, spent earlier, would have paid for a water system.

Cleaning Eggs

The eggs are cleaned by rubbing them with a damp rag. It is not advisable to put eggs in water, because the shells are porous, and the water would have a bad effect on the contents of the egg. Those eggs which are too badly stained to be cleaned readily by means of the damp rag can be cleaned by rubbing a little "Monkey Brand" soap on the rag and then applying it to the eggs. I have cleaned my eggs in this way for years and have never noticed any bad effect on the eggs, not even on the hatching eggs.

Co-operation in Selling Eggs and Buying Feed

There are many large firms in London who prefer to deal with one source of supply, and will give a better price for a regular supply of eggs of standard quality and size than could be obtained for irregular supplies of one or two farms. Both in Canada and here I have proved that a better price has been obtainable when large quantities of eggs are for sale. The chief points in selling eggs are to be sure that they are new-laid, infertile, clean, and not less than $1\frac{7}{8}$ oz. in weight. The smaller eggs usually can be sold to the same firm at a slightly lower price. The railway companies will make a lower rate than the usual for eggs sent in large quantities, such as 2 cwt. or 3 cwt. at a time.

It is essential that all members working in co-operation who supply eggs to the egg depôt or society shall be persons who can be relied upon to keep strictly to the rules of the society, and whose farms are run in accordance with the rules, and are open to inspection by the secretary without notice; that eggs may not be bought by any member from a non-member and sold to the society as produce from his farm. The reputation for supplying really fine eggs can be lost by carelessness in any one farm, and therefore the most important point is that you should know the character of the person who applies for membership, and be sure that he is a man who can be relied upon to observe all the rules faithfully. It would be impossible to admit as a member a farmer running his birds as farmers generally do, that is, on what is called "Free Range," which means eggs laid in hedges, under stacks, in stables, etc., and found many days or weeks, perhaps, after having been laid. The temptation is very often too great to resist selling them as "new laid" when prices are good. Hence "farmers'" eggs do not fetch the top price in any city in the world. Again, the farmers' hens have access to manure heaps and eat all kinds of disagreeable things. The flavour of an egg depends on the way a bird is fed. To prove that this is so, try feeding hens on onions, fish, or even rape, and test the taste of the eggs.

The advantage of buying feed in large quantities must be apparent to everyone. By forming a small society, every member paying cash within 14 days for the feed he has ordered through the secretary, capital is not needed. In our small society here we have been able to buy probably as cheaply as the local corn merchant. We can prove what benefit we individually have derived by comparing his prices with what we have to pay any week in the year.

ROUTINE WORK

The routine on this farm varies with the seasons, but roughly any week's work is as follows:—

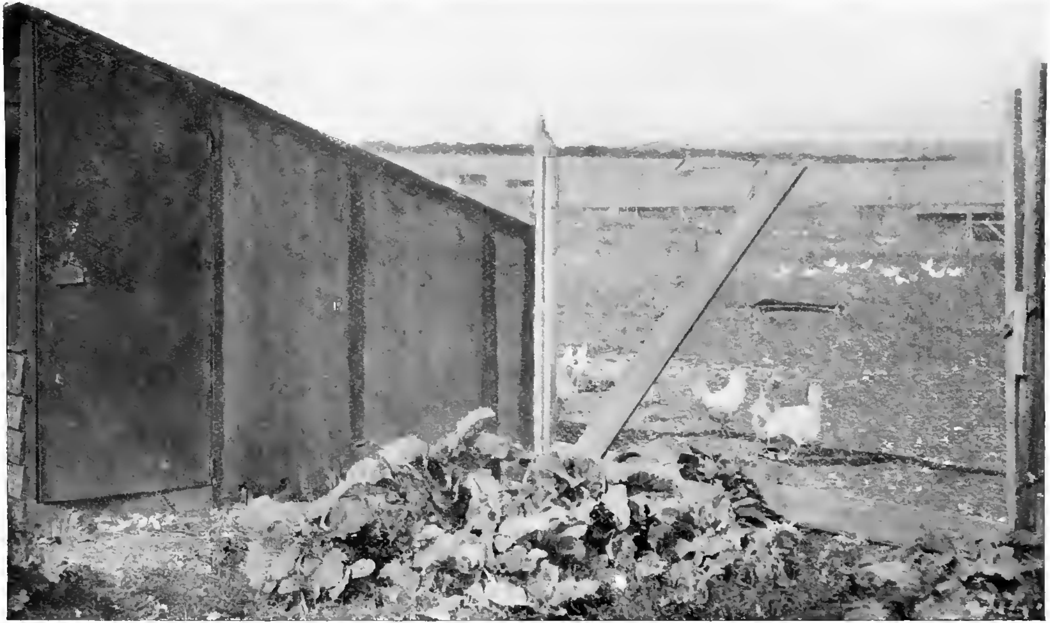
From October to March

Monday: *a.m.*, feed grain to birds, clean and fill water dishes, mix about 800 lbs. of dry mash and replenish dry mash boxes; clean, sort, and pack eggs; dispatch eggs to London; *p.m.*, clean and fill water dishes; collect eggs; shut houses.

Tuesday: *a.m.*, feed grain and give water as on Monday; clean all dropping boards; once a month, after cleaning, disinfect all houses; clean, sort, and pack eggs;
p.m., water birds; collect eggs; shut houses.

Wednesday: *a.m.*, feed grain and give water; clean, sort, and pack eggs;
p.m., water birds, collect eggs, and shut houses. If fresh straw is wanted in the houses it is usually put in on this day.

Thursday: feed grain; water birds as on other days; clean, sort, and pack eggs; dispatch eggs to London; mix dry mash, 800 lbs., and feed as on Monday; collect eggs; shut houses.



END VIEW OF LAYING HOUSE

SHOWING GATE INTO ANOTHER YARD AND KALE PLANTS

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Friday: same as on Tuesday, except that once a month creosoting perches is done on this day.

Saturday: same as on Wednesday; in addition replenish grit and shell boxes.

Sunday: same as on Saturday as regards feeding, watering, collecting eggs, and shutting houses.

April to May

In addition to attending to the hens as mentioned in the previous routine week:—

a.m., attend to incubator fire; turn and cool eggs; attend to brooder house fire; water chicks; feed chicks;

p.m., attend to incubator same as in morning; shut brooder house doors. 10 p.m. make up incubator and brooder fires for the night.

June to September

In addition to attending to the hens as usual: attend to brooder house (during June) as mentioned above; open colony house doors; attend to pullets; water; feed grain, mash, etc.

In *August* completely clean out all litter from laying houses, tar or creosote the floor, dropping boards, perches, and nests; put in dry sand or peat-moss dust, and 6 inches of straw; then move in pullets, as the hens cease to lay, and are sent to Smithfield.

LAST ROUND

Every evening after dark it is necessary to make a round of the farm. In the spring you have to attend to the incubator fire and brooder fire, and to see that the chicks are all right; and in all seasons you have to see that all the doors and gates are properly fastened. If there are broody hens you have to place them in the broody coops, at the same time making a note on the door of the coop of the day of the week those particular birds are to be released, which is three days later than the day they are placed in.

As White Leghorns are very nervous birds it is necessary in moving about the houses to walk slowly and not to make any movements which can frighten them. When it is necessary to move chicks or young stock or adult birds from one house to another, always do so after dark.

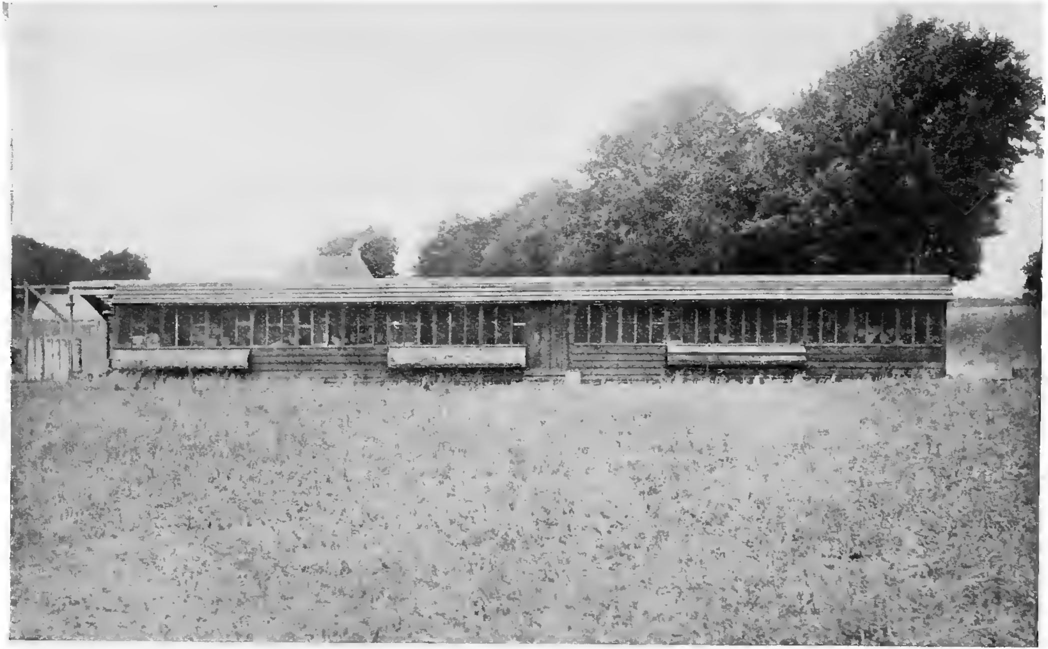
Making a Start

If the intending poultry farmer has a house, outbuildings, and eight or ten acres of land, he will need in addition at least £1 per bird capital, which means that if he intends to run a farm of 1000 layers, he must have £1000 cash and sufficient means to live on for two years; if he intends to run a farm of 500 layers, £500 will be needed as outlay.

The dwelling-house, land, and outbuildings are not considered as part of the capital for poultry farming, but as necessaries before an investment can be made. It would not be fair to charge the poultry farm with the rent of the dwelling-house or garden, but the rent of the land and outbuildings must be debited to the poultry farm, and as these vary so much in different parts of England, it would not be possible to state a definite sum.

It is to be clearly understood that the £1 per bird capital is quite apart from the other charges which I have mentioned, and the poultry farmer must see that he has a balance in hand in the proportions mentioned above, after paying for his residence, land, and outbuildings.

The best way to start is to build a laying house by October, and to buy sufficient good birds to fill it. The number of birds (and consequently the size of the house) must correspond with the number of eggs which will be required for hatching in the following spring. Thus, if 2500 eggs are to be incubated in two hatches of 1250 eggs each, and assuming that the oldest of the eggs are not to be more than seven days old at the date of starting the incubator, then you want as many hens as will lay 1250 eggs in seven days. Seven into 1250 goes 180 times. Allowing for a margin of eggs which are not suitable for incubating purposes, 200 eggs a day will be needed. Supposing March 21st is the day to start the incubator, the two-year-old hens should be laying at the rate of 66% per diem at that time of the year. So to get 200 eggs a day 300 two-year-old hens must be bought. These birds will hardly pay for their feed during the winter, but the benefit will be derived in spring, as the eggs for incubating being laid on the farm, will not have suffered damage by jarring, and will in consequence hatch much better. The eggs from these birds after the hatching season can be sold commercially and will show a profit over the cost of feeding. The



SOUTH VIEW OF 90 FT. HOUSE FOR 200 BIRDS

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birds can be used another season in the same way and then sold in the autumn. The first year's pullets will then in the following (third) spring be old enough, two years old, to breed from.

The other ways to start are, either to buy eggs for hatching in the spring, or to buy day-old chicks. The latter way is more expensive than the former, though it saves incubating labour and the cost of incubators. If the farm is to be run as economically as possible, this latter expense has to be faced some time or other; and only if it is impossible for one reason or another to do the incubating should day-old chicks be bought.

A proper incubating room must be ready by February 15th, incubators installed by March 1st, so as to allow time to run the machines empty, before filling them with eggs. The brooder house must be ready by April 1st; this date will also allow time to learn how to run the fire and to dry the house before the chicks are put in.

Assuming that the farm is to run 1000 laying hens, then in the first year it will be necessary to raise 500 pullets to the laying age. To make certain of this it is necessary to incubate 2500 eggs. Two thousand eggs may do, but it is safer to allow a margin, as the period of the year during which eggs can be hatched to produce pullets which will lay at the right time is limited from March 15th to April 21st. If from any reason bad luck should attend your efforts, say, about June, and chicks are lost, then the margin I have mentioned will carry you over. If bad luck does not come it is easy to dispose of surplus well-bred pullets. Usually too few are bred, rarely too many.

The margin may to many seem large, but on big American farms 8000 eggs are incubated to produce 1000 pullets at the laying age.

Allow 10% for infertiles at first test from 2500 eggs : 250.

Allow 10% for dead germs at second test from 2250 eggs : 225.

Allow 60% chicks from remaining 2025 eggs gives 1215 chicks.

Allow 50% cockerels, leaves 607 pullets.

Allow 15% deaths, leaves 517 pullets at laying age.

These 2500 eggs will cost about £40. Feed for the pullets to the laying age will cost about

2s. 6d. per bird, giving a total of £62 10s. The cockerels can be left out of account; not much more than the cost of the food which they have eaten can be obtained; reckoned with the cost of the eggs to hatch them, incubating and brooding charges, the selling price of the cockerels is about equal to the cost of their production.

Incubators for hatching 1250 eggs at one time will cost about £27. A room suitable for the incubators may be found in the outbuildings if £10 is spent on it. A brooder house to hold 1200 chicks costs about £100, with yards. A laying house to hold 500 pullets will cost at present about £200, with yards. (Before the war it cost about £140.) So that by October the following sums will have been spent:—

	£	s.	d.
Eggs for hatching . .	40	0	0
Feed	62	10	0
Incubators . . .	27	0	0
Incubator room . .	10	0	0
Brooder house . .	100	0	0
Laying house . . .	200	0	0
	£439	10	0

For drinking vessels, etc., allow £1-

A granary will be necessary. If an old building can be used £10 might fit it up. A pony, costing £10; a manure cart, a dry mash cart, each costing, say, £5; wheelbarrow, scrapes for cleaning boards; 15 egg boxes, each holding 30 dozen eggs, cost 8s. each, total £6; also an egg packing room is necessary.

2nd Year:—

	£	s.	d.
Eggs for hatching . .	40	0	0
Feed for chicks . .	62	10	0
Another laying house .	200	0	0
Small cockerel house .	25	0	0
	£327	10	0

A water system will have to be provided: a well with 3 h.p. engine and pump, tank, and stand pipes, etc.

Egg boxes, pony, etc., as mentioned above, say .	40	0	0
	£367	10	0

The income from the first year's pullets, above the cost of their feed, should be £150; might be more.

3rd Year :—

The first year's pullets are now two-year-old hens. From these birds breed 500 pullets, and sell the breeders as they stop laying in the autumn. Build sufficient colony houses to be ready in June, to be occupied by 500 pullets until the laying houses are emptied of the hens. The cost of these colony houses will be about £20 for 10 houses.

The income from the farm, in the third year, should be £300 or more on the £1000 invested.

If hens are bought in the autumn for the purpose of obtaining hatching eggs in the spring, it is well to buy those which are about 18 months old. For such birds, of a good strain, from a reliable breeder, 6s. to 7s. 6d. each must be paid. Cockerels to mate with the hens will cost 12s. 6d. to 15s. each.

The money to be spent, if hens instead of hatching eggs are bought to make a start, will be :—

1st Year :—	£	s.	d.
300 hens at 6s. . . .	90	0	0
15 cockerels cost . . .	10	0	0

1st Year (continued):—

	£	s.	d.
Laying house and yards for 315 birds	125	0	0
Feed for 315 birds for 12 months	100	0	0
Incubators	27	0	0
Incubator room . . .	10	0	0
Brooder house and yards .	100	0	0
Laying house and yards for 500 pullets	200	0	0
Feed for growing stock . .	62	10	0
	£724	10	0
Less sale of eggs not wanted for hatching, and cockerels .	100	0	0
	£624	10	0

2nd Year:—

Feed for hens . . .	100	0	0
15 cockerels cost . . .	10	0	0
Feed for growing stock . .	62	10	0
Enlarging the house holding 300 hens to hold 500 . .	75	0	0
Small cockerel house . .	25	0	0

2nd Year (continued):—

	£	s.	d.
Egg boxes, pony, etc., as in former account	40	0	0
	£312	10	0
Less sale of 300 hens at 2s., £30; less sale of eggs from 300 hens, £100	130	0	0
	£182	10	0

The income from the pullets will be the same as in the former account.

If these figures are taken as approximately accurate, *the first method has cost*:—

1st year: total expense	439	10	0
2nd „ : „ „	367	10	0
	£807	0	0

The second method has cost:—

1st year: total expense	624	10	0
2nd „ : „ „	182	10	0
	£807	0	0

I repeat that these figures must not be taken to be exact, as the market quotations for labour, building materials, etc., and feeding stuffs vary from year to year. At the same time, the estimates of profit, based on ten years' accounts, are approximately accurate.

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